ERCB Energy Resources Conservation Board

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Directive [XXX] — Draft

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Oil and Gas Development Within or Proximal to Water Bodies

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1 Introduction

The Alberta Government aims to protect water bodies on both public and private lands and has established setback distances to separate water bodies from oil and gas developments. The goal is to avoid disturbance to water bodies and to ensure that the appropriate mitigative measures are in place to protect them when siting oil and gas developments.

Varying annual precipitation levels can create challenges when assessing sites for the presence of water bodies, especially when the assessment occurs in a year that follows a number of consecutive low precipitation or dry years. The Energy Resources Conservation Board (ERCB) and Alberta Environment (AENV) have identified the recurrent issue of oil and gas developments where the well centre or facility equipment is not meeting the *Oil and Gas Conservation Regulations* respecting setback distances from a water body; in some cases the developments have occurred directly within water bodies. Sometimes these occurrences have been in association with nonpermanent, recurring wetlands or within floodplains of water courses. In some instances industry did not identify these as water bodies and did not obtain the necessary approval from AENV for construction in a water body.

The requirements set out in this directive have been jointly developed by the ERCB, AENV, Alberta Sustainable Resource Development (SRD), and the Special Areas Board (SAB) of Alberta Municipal Affairs. They are designed to provide a consistent, field-applicable methodology that can be used to identify and delineate water bodies and to accurately determine whether a new oil and gas development will meet the water body setback requirements or whether an existing development is meeting the setback requirements.

For oil and gas developments (i.e., wells and facilities) it is important that the appropriate information as described throughout this directive be obtained and assessed to determine the presence of a water body. Although government preference is to avoid water bodies, there may be circumstances where no other viable options exist; then development may proceed within or proximal to a water body, **provided** that all required approvals are in place, the proposed lease site and surrounding area have been assessed for sensitivities, and plans to address identified sensitivities have been developed and implemented.

Although this directive focuses primarily on wells and facilities requiring licensing pursuant to *Directive 056: Energy Development Applications and Schedules*, the direction provided on identifying and delineating water bodies must also be applied to all ERCB-regulated activities that are required to be set back from water bodies, which include

- oilfield waste management facilities and activities approved or conducted pursuant to *Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry*,
- drilling waste disposals conducted pursuant to *Directive 050: Drilling Waste Management*, and
- material storage conducted pursuant to *Directive 055: Storage Requirements for the Upstream Petroleum Industry*.

The requirements in this directive **do not** apply to pipelines; for guidance on pipelines, refer to the AENV *Water (Ministerial) Regulation* and the *Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body*.

2 Why Protect Water Bodies?

Water bodies are complex ecosystems that are an integral part of the water cycle. They contribute to water quality, drought relief, natural flood control, groundwater aquifer recharge, and shoreline stability. Water bodies also support a variety of plant, animal, and aquatic life that includes rare and endangered species. Not just the open-water portion of a water body is important; the habitat surrounding the open water is also of considerable importance, which is why the floodplain of a watercourse and the riparian area of a lake or wetland are considered to be inherent parts of a water body.

3 Water Bodies and Jurisdictional Overview

The ERCB, AENV, SRD, and SAB all have specific regulatory responsibilities respecting oil and gas development near or in water bodies. Throughout ERCB regulatory documents, both terms—"body of water" and "water body"—are used, while "water body" is used throughout the other agencies' regulatory documents. For clarity and consistency, the term "water body" is used throughout this directive. Section 4 describes different types of water bodies, including delineation of their outer boundaries, which is the point from which setback distances are to be applied.

3.1 Energy Resources Conservation Board

The ERCB is responsible for regulating the development of Alberta's energy resources, which includes protection of the environment during the construction, operation, and abandonment of the development, pursuant to the *Oil and Gas Conservation Act*, the *Oil Sands Conservation Act*, the *Pipeline Act*, and their regulations and cited directives.

The Oil and Gas Conservation Regulations specifies that a well centre and facility equipment must be sited 100 metres (m) (or a greater distance as directed by the ERCB) from a water body, unless prescribed or approved site-specific plans are implemented to protect the water body (Sections 2.120 and 8.060). It also sets out requirements regarding spill response contingency plans and exercises (Section 8.052) and states that if the location or condition of a well or facility may become a source of serious water pollution, the ERCB may require the well or facility to be abandoned (Section 8.070).

Directive 056 also provides direction on protection and mitigation measures and describes when the proposed use of these measures requires the application for a well or facility to be filed as routine or nonroutine. **The requirements in this directive clarify and update those in *Directive 056* on assessment and protection of water bodies and the application process.**

3.2 Alberta Environment

AENV is responsible for the protection of surface water bodies and groundwater under the *Water Act*, as well as for soil and groundwater remediation guidelines, policy for the application of risk assessments, and reclamation requirements for lands designated as specified lands under the *Environmental Protection and Enhancement Act*.

A *Water Act* approval is required for the following activities, as listed in the *Water Act* Interpretation Section 1(1)b:

i) placing, constructing, operating, maintaining, removing or disturbing works, maintaining, removing or disturbing ground, vegetation or other material, or carrying out any

undertaking, including but not limited to groundwater exploration, in or on any land, water or water body that

a) alters, may alter or may become capable of altering the flow or level of water, whether temporarily or permanently, including but not limited to water in a water body, by any means, including drainage,

b) changes, may change or may become capable of changing the location or direction of flow of water, including water in a water body, by drainage or otherwise,

c) causes, may cause or may become capable of causing the siltation of water or the erosion of any bed or shore of a water body, or

d) causes, may cause or may become capable of causing an effect on the aquatic environment;

ii) altering the flow, direction of flow or level of water or changing the location of water for the purposes of removing an ice jam, drainage, flood control, erosion control or channel realignment or for a similar purpose;

iii) drilling or reclaiming a water well or borehole;

iv) anything defined as an activity in the regulations for the purposes of the *Water Act*, but does not include an activity described in subclause (i) or (ii) that is conducted by a licensee in a works that is owned by the licensee, unless specified in the regulations.

Some examples of when an approval under the *Water Act* is required are

- placing a well pad, road, or berm within a water body,
- altering the flow of water,
- altering a watercourse (realignment), and
- draining a water body (dewatering).

Failure to obtain the requisite approval under the *Water Act* on both Crown and Freehold lands prior to commencing construction of a well or facility is an offence and may be subject to enforcement. Any required *Water Act* approvals must be in place ***prior*** to submitting an application to the ERCB for a well or facility licence. As set out in the *Provincial Wetland Restoration/Compensation Guide*, Alberta's priority is to reduce loss by avoiding, minimizing, and compensating impacts on wetlands and, hence, some *Water Act* approvals may require compensation for loss of wetlands.

In addition, there are notification requirements for oil- and gas-related activities set out in the following AENV codes of practice:

- *Code of Practice for Watercourse Crossings*,
- *Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body*, and
- *Code of Practice for Temporary Diversion of Water for Hydrostatic Testing of Pipelines*.

Applications for approvals under legislation administered by AENV, including the *Water Act*, are processed in the order in which complete applications are received. It is important to take into account the time required to complete the process of obtaining any requisite approval from AENV when contemplating lease, well, or facility construction timelines, as well as ERCB licensing timelines. Applications that do not contain sufficient site assessment information (see Section 6) may be refused.

3.3 Alberta Sustainable Resources Development

SRD is responsible for the administration and management of Crown land pursuant to the *Public Lands Act*, including the bed and shore of permanent and naturally occurring bodies of water. Unless an approval has been issued, it is prohibited under Section 54(1)(e) of the *Public Lands Act* to cause, permit or suffer the disturbance of any public land in any manner that results or is likely to result in injury to the bed and shore of any river, stream, watercourse, lake, or other water body or land in the vicinity of that public land.

SRD is also responsible for the administration and management of wildlife pursuant to the *Wildlife Act*. It is an offence to carry out any activity on either public or private land that harms a nest or den of prescribed wildlife without authorization from SRD under the *Wildlife Act*. Federal prohibitions also occur under the *Migratory Birds Convention Act*.

Any required SRD authorizations must be in place prior to submitting an application to the ERCB.

3.4 Special Areas Board

The SAB is responsible for the administration of a unique rural municipal area covering about 2.1 million hectares in southeastern Alberta pursuant to the *Special Areas Act* and its regulations and policies. The SAB has administrative jurisdiction over Public Lands within its boundaries.

The SAB, pursuant to *Policy 06-02: Access for Seismic Drill Lines and Well Site Development Near Water Bodies within the Special Areas* under the *Special Areas Disposition Regulation*, prohibits seismic drilling within the historical water lines and well site establishment within 100 m of the historical water lines of named water bodies within the Special Areas.

Any required SAB authorizations must be in place ***prior*** to submitting an application to the ERCB.

4 Information for Determining the Presence of Water Bodies and Establishing Setbacks

A water body may be natural or man-made. This section describes different types of water bodies and how to delineate their outer boundaries. Setback distances for oil and gas developments must be established from the outer boundaries.

For the purpose of this directive, **a water body is any location where water flows or is present, whether or not the flow or the presence of water is continuous, seasonal, intermittent, or occurs only during a flood** (from Section 1(1)(ggg) of the *Water Act*).

Temporary pooling of water as a result of snow melt, spring runoff, or heavy rain storms that does not induce change in soil and vegetation is not considered a water body.

Natural Water Body: Examples of a natural water body are a river, stream, creek, lake, and wetland (e.g., swamp, marsh, bog, fen, muskeg, and slough).

Intermittent or Seasonal Natural Water Body: Examples of an intermittent natural water body are ephemeral draws and other natural drainage features (e.g., dry creek beds and floodplains), as well as wetlands that show seasonal cycles of flooding and drying. The mere absence of water due to dry conditions (e.g., natural variability in precipitation) may not be

indicative that a water body does not exist. A temporary water body that is dry is still a water body.

Man-made Water Body: Examples of a man-made water body are irrigation canals, storm water detention/retention ponds, reservoirs, and dugouts. Ditches are excluded except where they connect to a water body that includes irrigation systems. A man-made water body is delineated by the water-land interface or the right-of-way for the man-made water body if the right-of-way has been surveyed; this delineation point must be used to establish the setback distance for development.

Floodplain: A floodplain consists of the low-lying land next to a watercourse (a flowing water body, such as a river, stream, or creek) that is subject to periodic inundation. A 1-in-100-year floodplain, which is the result of a flood having a 1 per cent chance of being equalled or exceeded in any given year, is used for purposes of development. The 1-in-100-year floodplain of a watercourse is part of a water body, and the setback distance for development must be established from the outer edge of the floodplain. In the absence of information that identifies the 1-in-100-year floodplain elevation, the best available information must be used to establish the historic high-water level for a water body.

Ecological Boundary: The ecological boundary of a water body is the farthest landward extent of the feature directly influenced by and ecologically part of the water body. It is defined by a distinct change in soils and/or vegetation as compared to adjacent upland vegetation. **The ecological boundary forms the outer limit of a wetland or lake, and the setback distance for development must be established from the ecological boundary.**

See Appendix 1 for information and figures that help illustrate delineation of water bodies, floodplains, and ecological boundaries.

5 Requirements to Assess Sites for Water Bodies and the *Directive 056* Application Process for New Well and Facility Licences

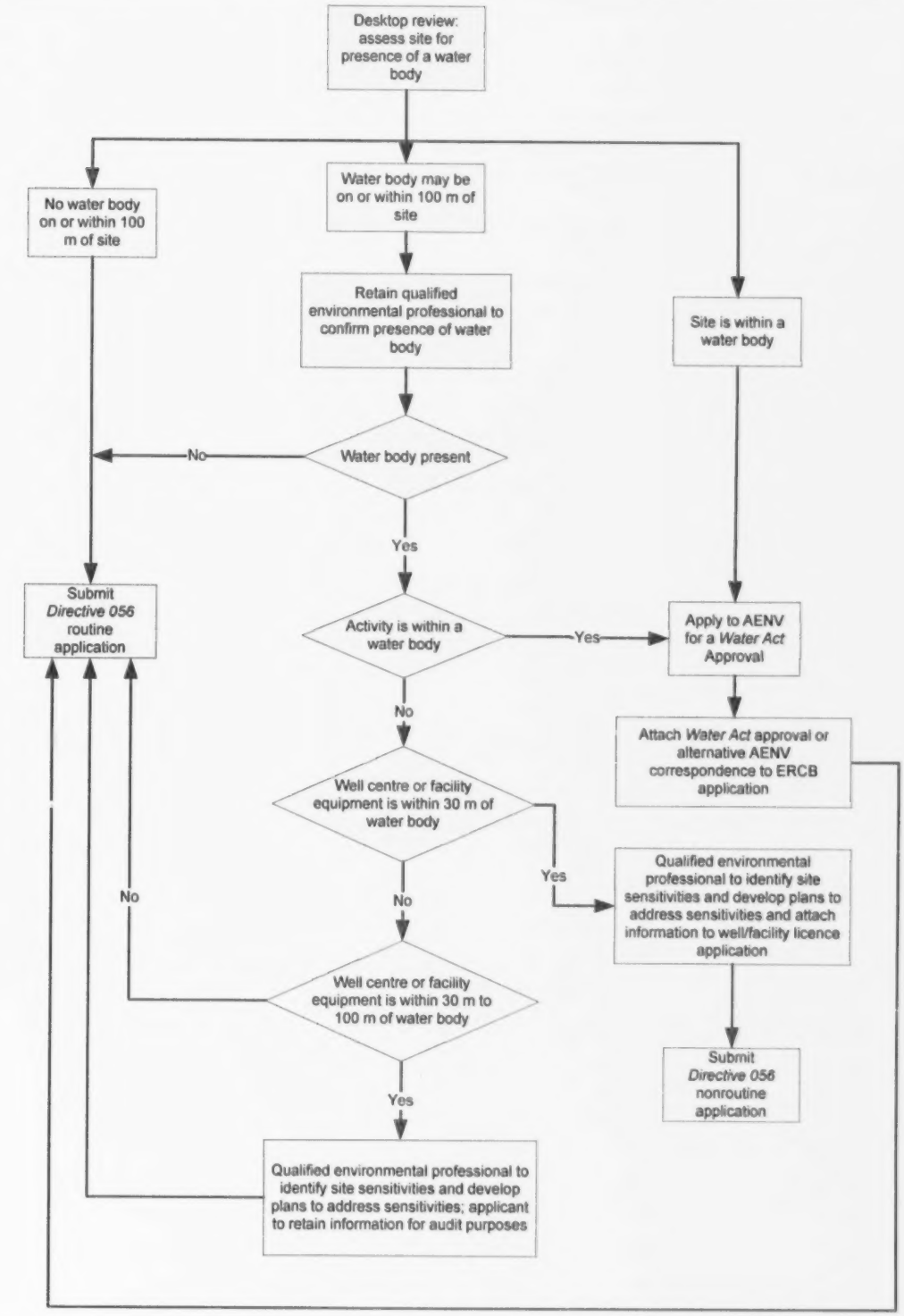
Upfront site assessments must be done to facilitate the selection of new well and facility sites that avoid disturbance to sensitive areas either in or proximal to water bodies. The requirements and process set out in the following sections must be followed to

- identify and delineate any water bodies within 100 m of a proposed development,
- accurately establish setbacks,
- identify the need for a *Water Act* approval,
- assess and address site sensitivities if development in or proximal to a water body cannot be avoided, and
- identify whether to file a routine or nonroutine application to the ERCB for a well or facility licence pursuant to *Directive 056*.

Figure 1 is a flowchart summarizing the steps identified above. The steps below are required to file a *Directive 056* application with the ERCB.

1) Prior to submitting an application to the ERCB for a well or facility licence, applicants must assess the proposed site to identify potential water bodies and where applicable delineate a water body following the requirements set out in Section 6.

Figure 1. Assessment for water bodies and the *Directive 056* application process


Desktop review: assess site for presence of a water body
No water body on or within 100 m of site
Water body may be on or within 100 m of site
Site is within a water body
Retain qualified environmental professional to confirm presence of water body
No
Water body present
Yes
Submit *Directive 056* routine application
Activity is within a water body
Yes
Apply to AENV for a *Water Act* Approval
No
Attach *Water Act* approval or alternative AENV correspondence to ERCB application
Well centre or facility equipment is within 30 m of water body
Yes
Qualified environmental professional to identify site sensitivities and develop plans to address sensitivities and attach information to well/facility licence application
No
No
Well centre or facility equipment is within 30 m to 100 m of water body
Submit *Directive 056* nonroutine application
Yes
Qualified environmental professional to identify site sensitivities and develop plans to address sensitivities; applicant to retain information for audit purposes

- Submit a **routine** application to the ERCB for the well or facility licence if the site assessment information identifies that the well or facility development does not require a *Water Act* approval (e.g., does not intrude into a water body, alter the flow of water or a water course, or drain a water body) or will have a distance of 100 m or more separating the well centre or facility equipment from the water body.
- Do not submit an application for a well or facility licence if the site assessment information identifies that the development requires a *Water Act* approval. If avoidance of the water body is not an option, submit an application to AENV for a *Water Act* approval.
- Once a *Water Act* approval has been obtained, submit a **routine** application to the ERCB for the well or facility licence and attach the approval from AENV to the application.

2) If the site assessment information (see Section 6) identifies that a water body may be present, a qualified environmental professional must be retained to evaluate the site and confirm the presence or absence of the water body. The applicant must retain the site assessment package prepared and signed by the environmental professional.

3) If the site assessment information or qualified environmental professional identifies that a *Water Act* approval must be obtained from AENV, the applicant must
   - obtain a *Water Act* approval, and
   - submit a **routine** application to the ERCB for the well or facility licence and attach the *Water Act* approval from AENV to the application.

4) If a well centre or facility equipment is to be located within 100 m of the water body, the applicant must retain a qualified environmental professional to assess the area for the following site sensitivities:
   a) local drainage patterns around and across the site and access road;
   b) local hydrologic conditions and potential for the site to flood;
   c) soil characteristics and texture in terms of both changes from upland conditions and potential infiltration or transportation of contaminants and sediments in surface or groundwater;
   d) presence of native plant communities or rare plants or plant communities within or adjacent to project disturbances;
   e) presence or use of the site or adjacent areas by wildlife, and potential of the site to support wildlife during all or part of their life-cycle (although there should be particular attention to sensitive species or species at risk provincially and federally, all wildlife must be considered); and
   f) relationship of the site to adjacent upland habitats.

5) The applicant must retain a qualified environmental professional to address all site sensitivities (from point 4) through the development of spill management plans, environmental protection plans, sediment and erosion control plans, drainage management plans, contingency plans, reclamation plans, long-term monitoring plans, maintenance plans, and/or quality assurance/quality control programs. In addition, the site must be designed to maximize the distance between high-risk pieces of equipment (e.g., tanks, flare stack) and the water body.

- For a well centre or facility equipment within 30 m of the water body, submit a **nonroutine** application to the ERCB for the well or facility licence and attach an information package containing the site assessment information, site sensitivities identified, and plans developed to address site sensitivities.
- For a well centre or facility equipment located farther than 30 m from the water body but within 100 m of it, submit a **routine** application to the ERCB for the well or facility licence; retain and make available to the ERCB upon request (e.g., through an audit) the information generated by the qualified environmental professional respecting the site assessment, any site sensitivities identified, and plans developed to address site sensitivities.

6 Information Requirements for Identifying Water Bodies

This section sets out the information that, as a minimum, must be assessed to determine whether the proposed well or facility site is in or proximal to a water body. This information must be retained by the company that will be named as the licensee of the well or facility (e.g., not a consultant acting on behalf of the company) for audit of routine applications; it must be submitted with nonroutine applications.

The predisturbance site assessment provides the opportunity to evaluate options for avoidance of sensitive areas. Options include adjusting lease boundaries or configurations, or preferably, selecting a different site that is 100 m or more away from a water body.

The requirements set out in points 1 to 4 of Section 5 form the desktop part of the review, while point 5 involves on-site work. The assessment must be completed prior to submitting an application to the ERCB for a well or facility licence. The information acquired during this process must be documented and retained for audit purposes or submitted as part of a nonroutine application package. In situations where information is not available, the steps undertaken in an attempt to find the information must be documented.

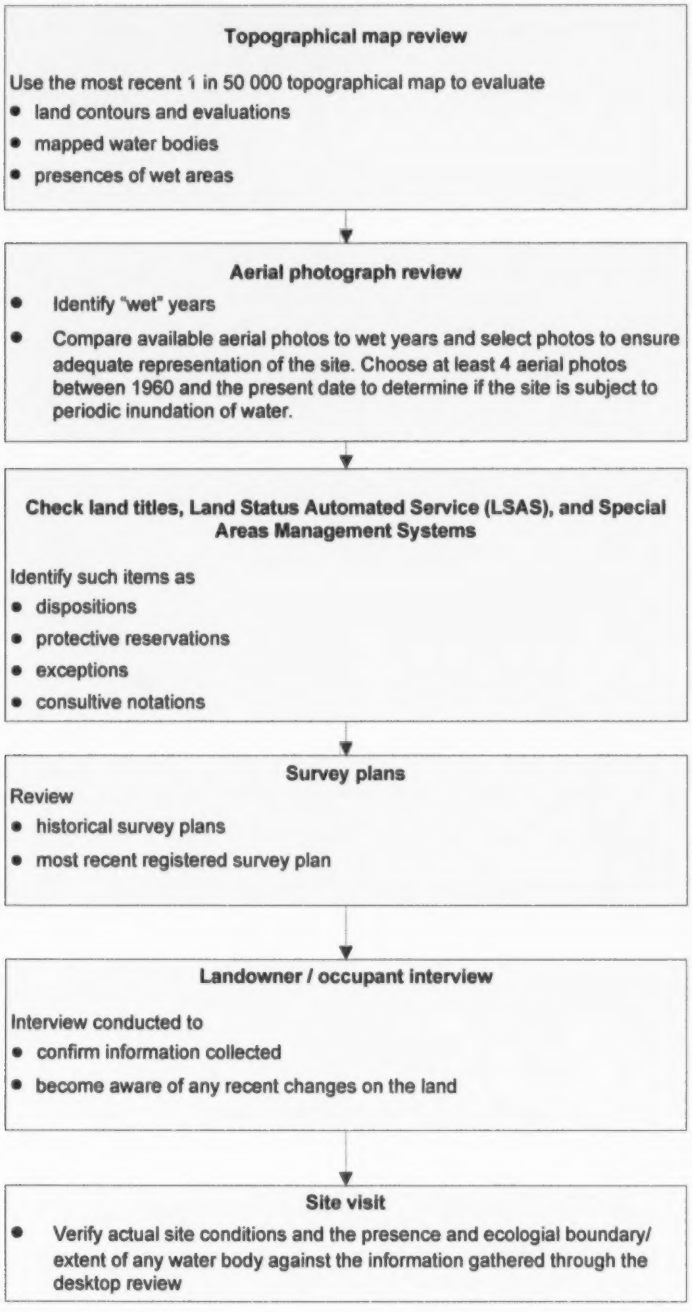
Figure 2 is a flowchart summarizing the steps set out below to identify a water body.

1) Review the most recent 1:50 000 topographic map for the area of the proposed site for indications of water bodies and drainage patterns. Items to consider include land contours and elevation, mapped water bodies, and vegetation.
   - Note that Digital NTS 1:50,000 map sheets may be downloaded free from the Natural Resources Canada, Digital Topographical Maps of Canada Web page at http://atlas.nrcan.gc.ca/site/english/maps/topo/map.

2) Review aerial photography taken on multiple dates to ascertain the history of the area and to help avoid selection of sites subject to recurring inundation by water. The aerial photographs selected must represent a range of conditions for the site, including the maximum extent of flooding or inundation by water. To determine if the photograph represents a wet or dry period, the extent of wetlands or flooding must be correlated with climatic conditions. The most recent photograph must also be reviewed. Use of satellite imagery is not acceptable.

   Mandatory methodologies or specific aerial photographs are not prescribed, but a record of the method, source, and aerial photographs used in the review must be submitted with the application, if required, or retained on file and made available to the ERCB upon request.

Figure 2. Site assessment requirements for identification of a water body


Topographical map review
Use the most recent 1 in 50 000 topographical map to evaluate
• land contours and evaluations
• mapped water bodies
• presences of wet areas
Aerial photograph review
• Identify "wet" years
• Compare available aerial photos to wet years and select photos to ensure adequate representation of the site. Choose at least 4 aerial photos between 1960 and the present date to determine if the site is subject to periodic inundation of water.
Check land titles, Land Status Automated Service (LSAS), and Special Areas Management Systems
Identify such items as
• dispositions
• protective reservations
• exceptions
• consultive notations
Survey plans
Review
• historical survey plans
• most recent registered survey plan
Landowner / occupant interview
Interview conducted to
• confirm information collected
• become aware of any recent changes on the land
Site visit
• Verify actual site conditions and the presence and ecologial boundary/ extent of any water body against the information gathered through the desktop review

See Appendix 2 for information on public access to aerial photographs and climatic data.

3) Review information available through Land Titles and Land Status Automated Service (LSAS) or from the Special Areas Management System (SAMS) if the proposed development is within the Special Areas, and document any information relating to environmental protection. Items to consider include dispositions, protective reservations, exceptions, and consultative notations.

4) Review the most recent registered survey plan for the area of the proposed site for previously surveyed water body boundaries. In some instances the historic township survey plan may be the only survey plan available that identifies water bodies or marshy wetland areas.

5) If the desktop review identifies the existence of or the potential for a water body within 100 m of the proposed well centre or facility equipment, a qualified environmental professional must be retained to evaluate the site, confirm the presence or absence of a water body, and delineate the boundary of the water body. Evaluation of the site must include

   a) an interview with the landowners or occupants to confirm the information from the topographic maps and aerial photographs (If a landowner/occupant is new to the area, previous landowners/occupants or neighbours may be an alternative resource for this information. The questions asked and responses received must be documented and retained as part of the site assessment and consultation information package.)

   b) a site visit to confirm the information obtained through the desktop review

6) Once a water body boundary has been determined and located in the field, it must be included in the survey plan submitted with the application. If it is confirmed that the proposed well centre or location of facility equipment will be within 100 m of the water body, the qualified environmental professional must assess the site for the sensitivities listed in Section 5(4) and must develop plans to address the sensitivities, as set out in Sections 5(5). Where avoidance of a water body within a lease is planned, the survey plan must clearly illustrate this.

7 Assessing Existing Oil and Gas Developments for Proximity to Water Bodies and Addressing Site Sensitivities

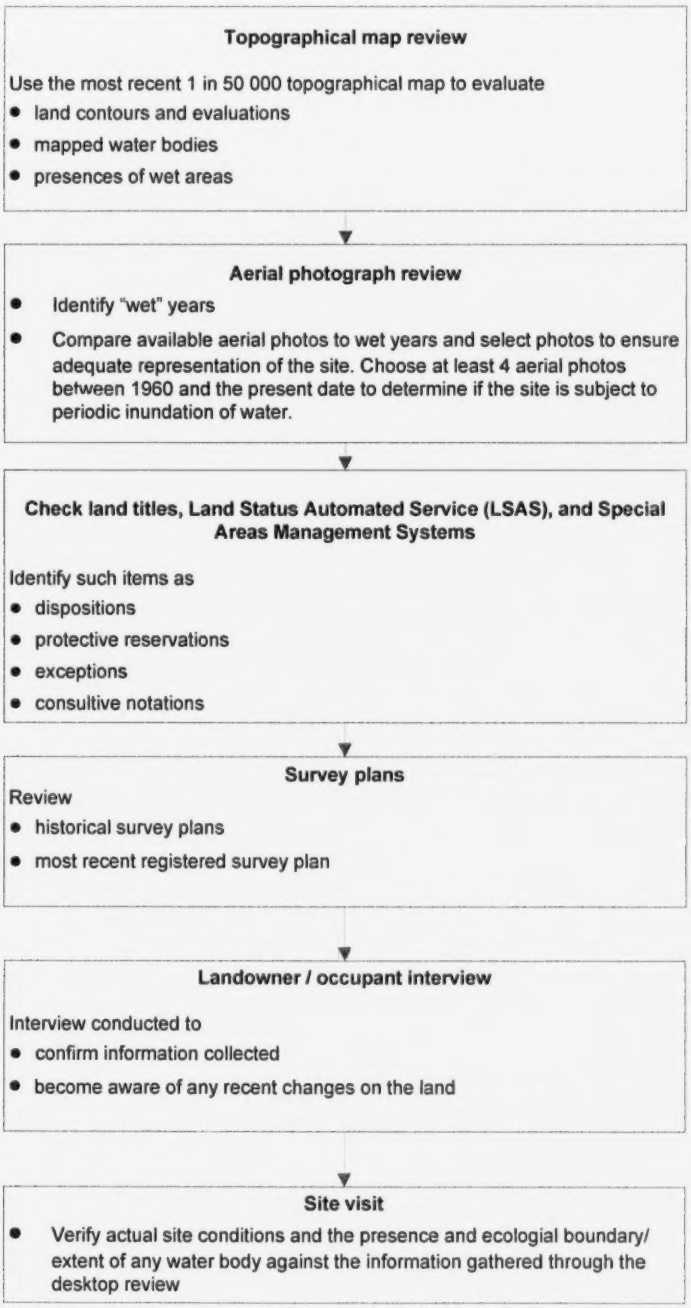
The Oil and Gas Conservation Regulations and *Directive 056* clearly identify that a well centre and facility equipment must be 100 m from a water body unless approved mitigative measures to protect the water body are implemented. *Directive 056* further qualifies that the measures implemented are expected to comply with all relevant requirements of provincial and federal legislation, including the *Environmental Protection and Enhancement Act*, *Water Act*, *Public Lands Act*, *Fisheries Act*, and the *Navigable Waters Protection Act* and their regulations.

The following requirements apply to wells and facilities licensed prior to [date of publication of this directive] and to wells and facilities being modified.

1) Licensees must identify wells and facilities that are not meeting the 100 m water body setback distance through site visits and by reviewing topographic maps, aerial photography, and survey plans for the sites (see Section 6).

2) For wells where approval for a reduced water body setback was received or where mitigative measures identified in *Directive 056* were implemented and the routine well

Figure 2. Site assessment requirements for identification of a water body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3) Review information available through Land Titles and Land Status Automated Service (LSAS) or from the Special Areas Management System (SAMS) if the proposed development is within the Special Areas, and document any information relating to environmental protection. Items to consider include dispositions, protective reservations, exceptions, and consultative notations.

4) Review the most recent registered survey plan for the area of the proposed site for previously surveyed water body boundaries. In some instances the historic township survey plan may be the only survey plan available that identifies water bodies or marshy wetland areas.

5) If the desktop review identifies the existence of or the potential for a water body within 100 m of the proposed well centre or facility equipment, a qualified environmental professional must be retained to evaluate the site, confirm the presence or absence of a water body, and delineate the boundary of the water body. Evaluation of the site must include

   a) an interview with the landowners or occupants to confirm the information from the topographic maps and aerial photographs (If a landowner/occupant is new to the area, previous landowners/occupants or neighbours may be an alternative resource for this information. The questions asked and responses received must be documented and retained as part of the site assessment and consultation information package.)

   b) a site visit to confirm the information obtained through the desktop review

6) Once a water body boundary has been determined and located in the field, it must be included in the survey plan submitted with the application. If it is confirmed that the proposed well centre or location of facility equipment will be within 100 m of the water body, the qualified environmental professional must assess the site for the sensitivities listed in Section 5(4) and must develop plans to address the sensitivities, as set out in Sections 5(5). Where avoidance of a water body within a lease is planned, the survey plan must clearly illustrate this.

7 Assessing Existing Oil and Gas Developments for Proximity to Water Bodies and Addressing Site Sensitivities

The Oil and Gas Conservation Regulations and *Directive 056* clearly identify that a well centre and facility equipment must be 100 m from a water body unless approved mitigative measures to protect the water body are implemented. *Directive 056* further qualifies that the measures implemented are expected to comply with all relevant requirements of provincial and federal legislation, including the *Environmental Protection and Enhancement Act*, *Water Act*, *Public Lands Act*, *Fisheries Act*, and the *Navigable Waters Protection Act* and their regulations.

The following requirements apply to wells and facilities licensed prior to [date of publication of this directive] and to wells and facilities being modified.

1) Licensees must identify wells and facilities that are not meeting the 100 m water body setback distance through site visits and by reviewing topographic maps, aerial photography, and survey plans for the sites (see Section 6).

2) For wells where approval for a reduced water body setback was received or where mitigative measures identified in *Directive 056* were implemented and the routine well

licence application process was followed, licensees must evaluate whether any of the site sensitivities set out in Section 5(4) exist and whether the mitigative measures implemented effectively address the site sensitivities. Licensees must retain a qualified environmental professional to develop and implement plans, as described in Section 5(5) to address any site sensitivities not being effectively managed.

3) For facilities where approval for a reduced water body setback was received, licensees must evaluate whether any of the site sensitivities set out in Section 5(4) exist and whether the mitigative measures implemented effectively address the site sensitivities. Licensees must retain a qualified environmental professional to develop and implement plans, as described in Section 5(5) to address any site sensitivities not being effectively managed.

4) For wells and facilities not meeting the 100 m water body setback and for which approval for a reduced setback was not received or the *Directive 056* routine well licence application process was not followed, licensees must retain a qualified environmental professional and follow the direction set out in Section 5(4) and (5) to identify site sensitivities and develop and implement plans to address the sensitivities.

5) If it has been determined that the well or facility was developed in a water body without the required *Water Act* approval, licensees must submit to AENV the information from the qualified environmental professional detailing the site assessment and the plans developed and implemented to address the site sensitivities.

   Prior to undertaking any activity within a water body, the licensee must obtain relevant and appropriate authorizations from AENV, SRD, or SAB, as appropriate.

6) Licensees must have the all work completed (i.e., site assessment and plans developed and implemented) by September 30, 2014. Upon request, licensees must make available to the ERCB information supporting this work, including evaluations and reports prepared by the qualified environmental professional.

The ERCB expects licensees to preferentially assess wells and facilities where there are higher risks to water bodies. After September 30, 2014, licensees of wells and facilities may be subject to ERCB, AENV, SRD, or SAB compliance assurance processes if any agency finds wells or facilities licensed prior to [date of publication of this document] where the 100 m water body setback and effective mitigation measures are not being met or where development occurred in a water body and the work set out in this section has not been completed (i.e., assess site, identify site sensitivities, and develop and implement plans to address site sensitivities).

The ERCB, AENV, SRD, and SAB may intercede, prior to 2014, if it is determined that a water body is at risk and immediate remedial actions are needed to reduce or eliminate risk to the water body.

The ERCB compliance assurance process is set out in *Directive 019: ERCB Compliance Assurance—Enforcement.*

8 Who Is a Qualified Environmental Professional?

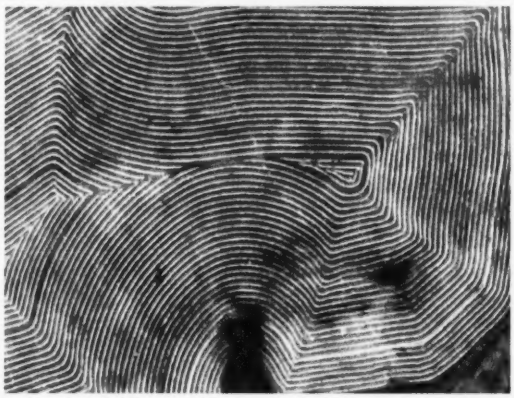
For the purpose of verifying the presence or absence of a water body, delineating setbacks to a water body, and assessing site sensitivities and developing plans to address site sensitivities for developments within 100 m of the water, a qualified environmental professional is a person acting alone or together with other qualified environmental professionals who

- possesses a postsecondary degree in biological, environmental, or natural resource sciences from an accredited college or university, or a technical diploma in biological, environmental, or natural resource sciences from an accredited college, or educational equivalencies,
- has technical knowledge and experience in aerial photography interpretation, water body delineation, and assessment of vegetation, soils and hydrology,
- is a registered member in good standing of a regulated professional association in Alberta constituted under an act of the Alberta Legislature, acts under that association's code of ethics, and is subject to disciplinary action by that association's practice review board or its equivalent, and
- is acting within his/her area of expertise.

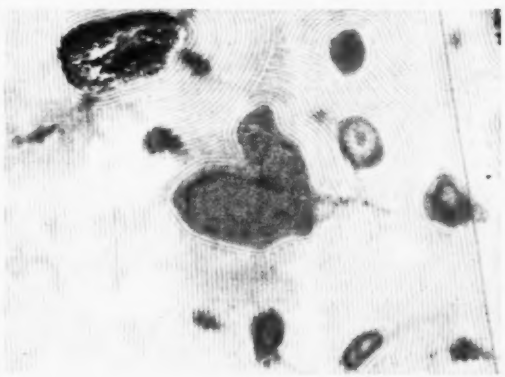
Appendix 1 Identifying and Delineating Water Bodies

The figures below are provided to assist in identifying and delineating water bodies. Note that some of the figures refer to the Stewart & Kantrud wetland classification system. The Alberta Government does not at this time adhere to any particular classification system for use throughout the province. Within Alberta, the Steward & Kantrud system is specific to the prairie pothole region (grassland and parkland natural regions) and is one of several widely used and accepted wetland classification systems. Some other commonly used classification systems include the Cowardin system, the Canadian Wetland Classification System, the Alberta Wetland Inventory system, and Alberta's Ecosite classification system.

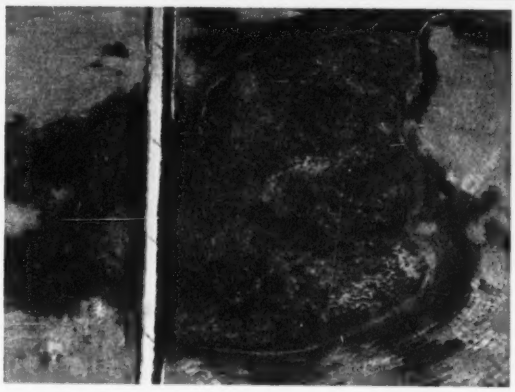
Figure 1. Recognizing and Identifying Wetlands on the Landscape (Stewart & Kantrud wetland classifications)



Ephemeral Water Features (Stewart & Kantrud Class 1 Wetland)
Low-lying areas where water is briefly ponded in early spring before soils are thawed or after a storm event. Central basin of the wetted area typically has the same vegetation and soils as the surrounding land. In agricultural areas these low-lying areas are typically cultivated. These features are not always recognized as wetlands or as water bodies due to their short-term presence on the landscape.

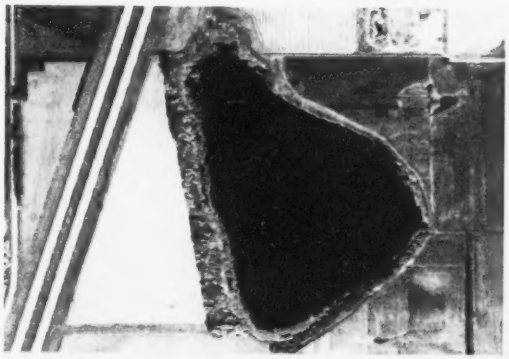


Temporary Wetlands (Stewart & Kantrud Class 2 Wetland)
Surface water exists for a few weeks only after snow melt and only several days after heavy rain/storm events. Vegetation in the centre of the basin consists of low-stature wet meadow plants composed of fine-textured grasses, rushes, and sedges.



Seasonal Wetland (Stewart & Kantrud Class 3 Wetland)
Basins are typically inundated by water for more that three weeks, but usually dry by late July. Central part of basin is represented by shallow marsh vegetation (moderately coarse grasses and sedges with associated forbs).

Semi-Permanent Wetlands (Stewart & Kantrud Class 4 Wetland)
Water persists into autumn in 7 of 10 years. Only intermittently exposed. Central basin is represented by deep marsh vegetation (relatively coarse marsh emergents or associated submerged aquatics).



Permanent Ponds and Lakes (Stewart & Kantrud Class 5 Wetland)
The central portion of the water body is permanently inundated with water throughout the year. The open water is surrounded by deep-marsh, shallow-marsh, or wet meadow vegetation zones. During droughts, bare bed will be evident during draw-down phase and may be temporarily vegetated with annual weeds or other primary successional plants.

Alkali Wetlands (Stewart & Kantrud Class 6 Wetland)
Shallow, with highly variable water levels. Basin is typically devoid of emergent vegetation. Vegetation adapted to highly saline environments is generally limited to periphery. Frequently bounded by exposed soils forming a dry alkali ring.

Prairie wetlands typically experience regular drawdown or drying cycles, followed by reinundation, depending on local and regional climatic fluctuations. A review of the aerial photo history will clearly show this cycle. Vegetation associated with wetlands is typically arranged in distinct zones or bands along a moisture gradient from the centre of the wetland basin to the upland (Figure 2). These bands of vegetation can be seen throughout the non-winter season. The "ecological" boundary of the wetland is on the upland side of the wet meadow zone where upland plant communities begin.

Vegetation zonation is evident in this permanent wetland throughout the growing season. The ecological boundary of the wetland is defined by the outermost wetland vegetation zone.

Figure 2. Delineating Ecological Boundaries of a Wetland

Early summer

Late summer

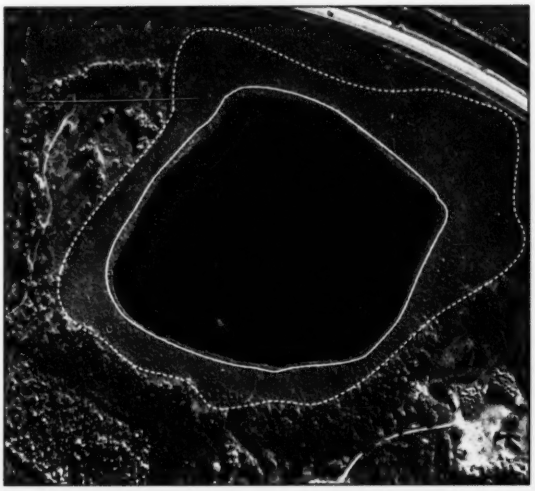
Early autumn

Late autumn

Late autumn (water line, shore, and vegetation zones delineated). Willow tree and right-most line represent both the natural ownership and ecological boundary of this permanent Crown-owned body of water (wetland).

In agricultural areas where cereal cropping occurs, the boundary will frequently be near the limit or cultivation or where annual cereal crops will grow.

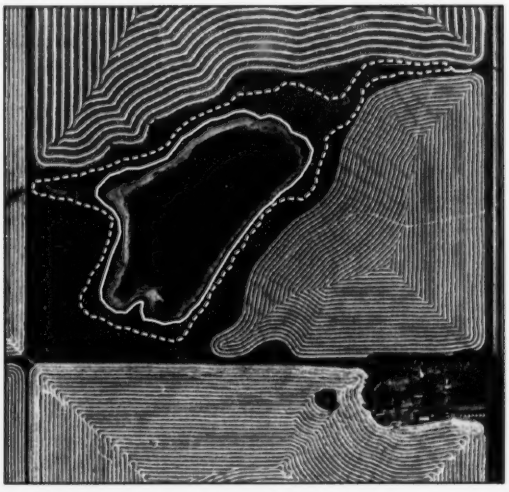
Figure 3. Water Body Boundaries—Permanent and Semi-Permanent Wetland



In Figure 3, the solid line (_____) represents the approximate natural boundary defined under Section 17 of the *Surveys Act* for the purpose of determining an "ownership" boundary between two property owners (the Crown and the adjoining titled upland owner) and is used to determine if a *Public Lands Act* disposition will be required. The natural boundary is the landward side of the vegetation zone defined by aquatic emergent species.

The dashed line (- - - -) represents the approximate ecological boundary of the permanent wetland that defines the boundary of the water body under the *Water Act*, as well as for the purpose of establishing the jurisdictional setback when planning the location of oil and gas facilities. It will vary depending on hydrological conditions. It is located where the wet meadow vegetation transitions into upland vegetation (perennial grasses, forbes, shrubs, and trees).

Figure 4. Water Body Boundaries—Permanent Wetland in Agricultural Areas



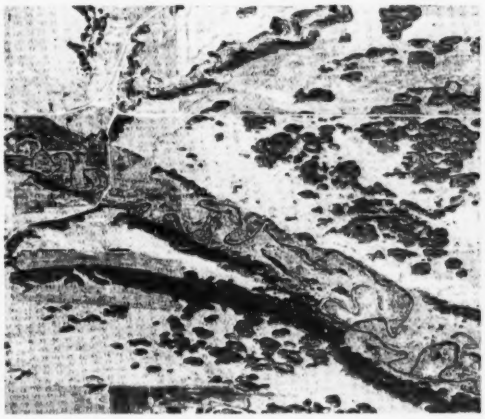
In Figure 4, the solid line (_____) represents the approximate natural boundary determining the "ownership" boundary between two property owners (the Crown and the adjoining titled upland owner).

The dashed line (- - - -) represents the approximate "ecological" boundary of the wetland. It will vary depending on hydrological conditions. In many cases it will be where the emergent vegetation zone (or the wet meadow zone depending on the wetland type) interfaces with woody shrubs such as willows. In areas where the surrounding land is cropped, the physical constrains to access the area by farm equipment or to sustain annual crops define the limit of cultivation, and the ecological boundary is frequently synonymous with this line.

Figure 5. Lake Boundaries

Lakes generally have well-defined banks that delineate the boundary of the water body. Exposed shore areas are part of the lake bed.

Figure 6. Floodplain Boundaries



Printed with permission from Cows and Fish Alberta Riparian Habitat Management Society.

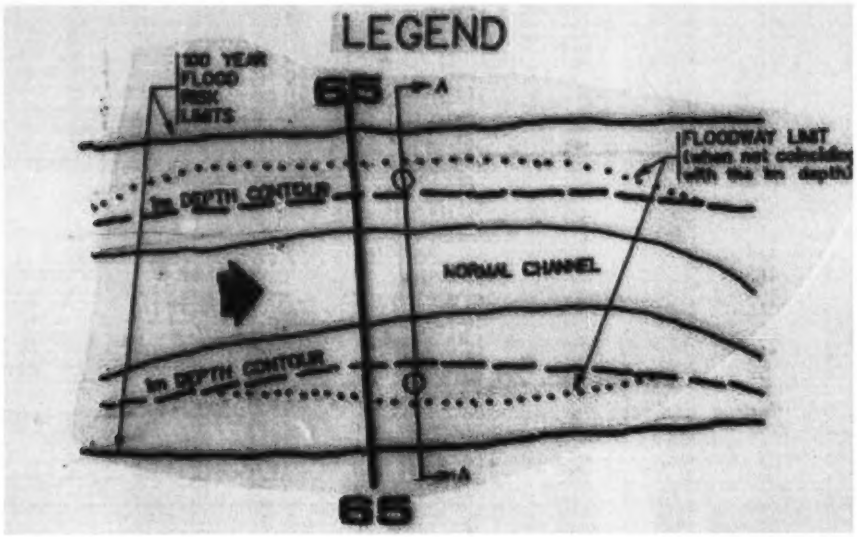
The Vermillion River meanders through a confined floodplain. The rising valley slopes define the meander belt. Not all floodplains are so confined.

How to Recognize Floodplains of Watercourses

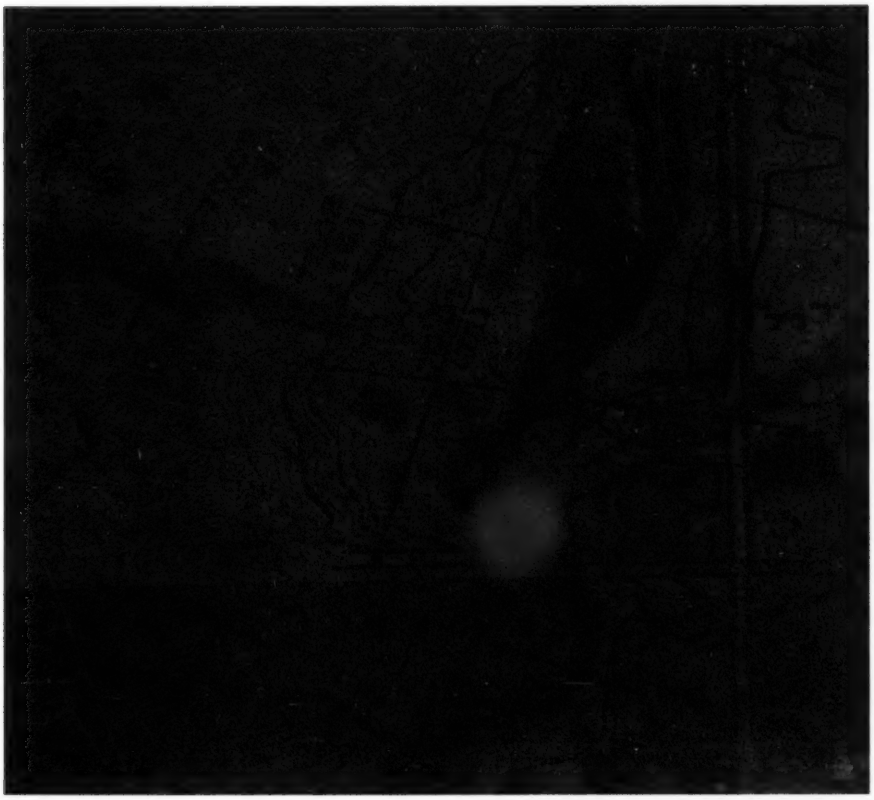
Watercourses are dynamic and respond to variations in flow and sediment load. Watercourses move across the landscape over time through processes of degredation and aggredation, as they seek to establish a state of equilibrium between erosion and deposition of sediment. During high-flow events, water flow can exceed bankfull capacity and spill onto adjacent floodplains. Developments within a floodplain are then at risk from flood damage, which may then pose additional environmental risks.

To minimize risk of floods, developments are frequently restricted to outside the generally accepted 1-in 100-year flood elevation or line. A 100-year flood is a flood having a 1 per cent chance of being equalled or exceeded in any given year. Based on the expected floodwater level data (defined by monitoring gauges or geomorphic indicators), a predicted area of inundation can be mapped out.

Example of a 1-in-100-year floodplain map:



Example of an aerial photograph with the floodplain map information overlaid:

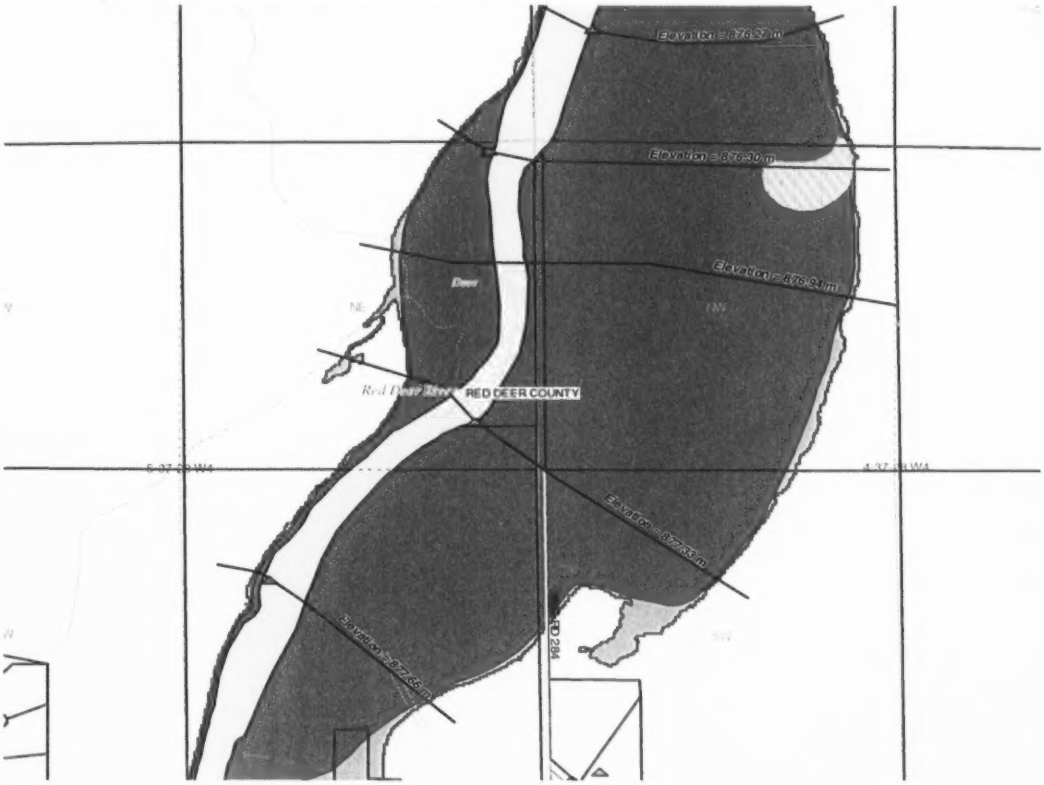


The Alberta Environment Flood Risk Map Information & Benchmark Retrieval System is available on the Web at http://www.telusgeomatics.com/tgpub/ag_flood/.

Limitations to the information contained on this site:

- Only specific municipalities have flood risk map information available. As new flood risk maps are completed, they will be added to this site.
- Flood lines shown are based on the design flood. In Alberta, the design flood is the 100-year flood. Larger flood events will put a larger area at flood risk.
- The flood lines shown are a digital representation of detailed engineering maps. For precise flood line locations at a specific site, contact AENV-Flood.Risk-Maps@gov.ab.ca.
- All benchmark locations have been calculated to the centre of the quarter section based on the Alberta Township Survey (ATS) and should NOT be used in determining the exact field location. To determine the exact field location of a benchmark, view the description on the scanned sheet.

An example of information that can be found on this site:



Legend

- Floodway
- Flood Fringe
- Overland Flow Area
- Normal Water Surface
- Benchmark
- Highway/Road

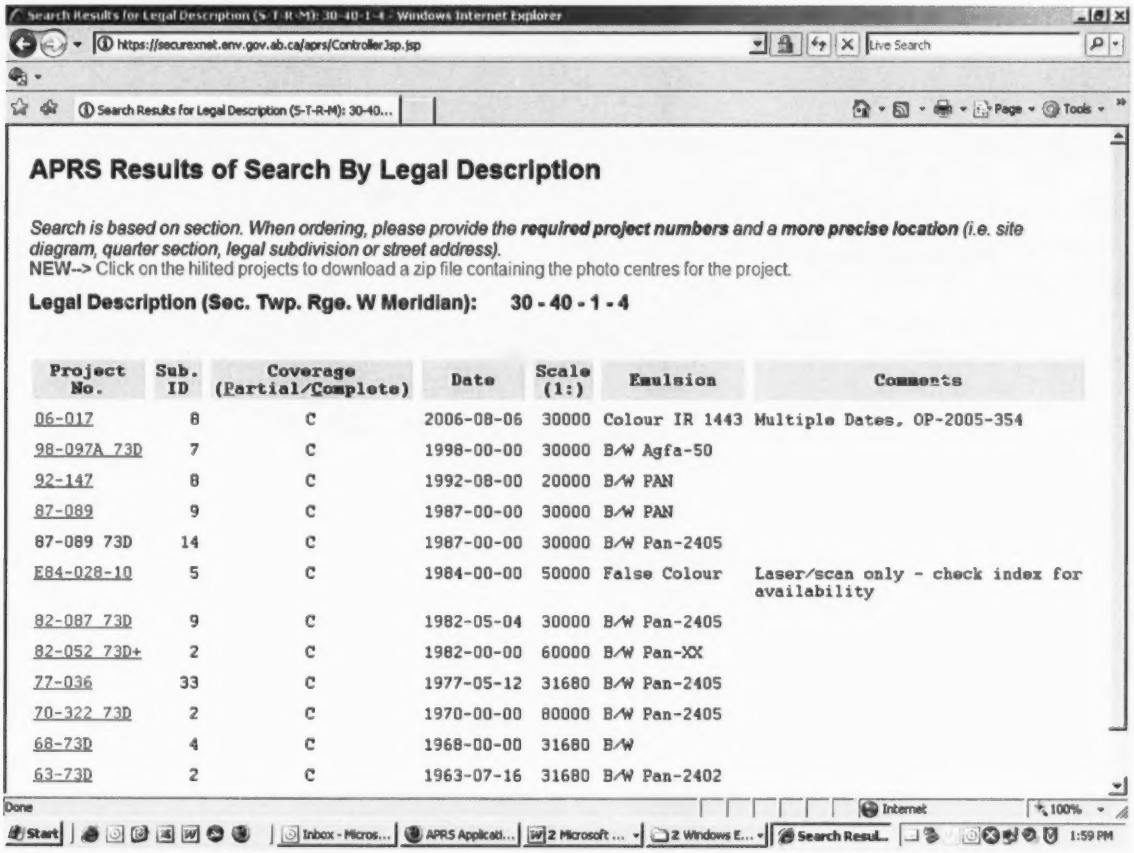
Appendix 2 Publicly Available Aerial Photographs and Climatic Data

1) Aerial photographs can be obtained at Air Photo Record System (APRS) at https://securexnet.env.gov.ab.ca/aprs/index.html.

   Access the Web site and enter the user name and password as

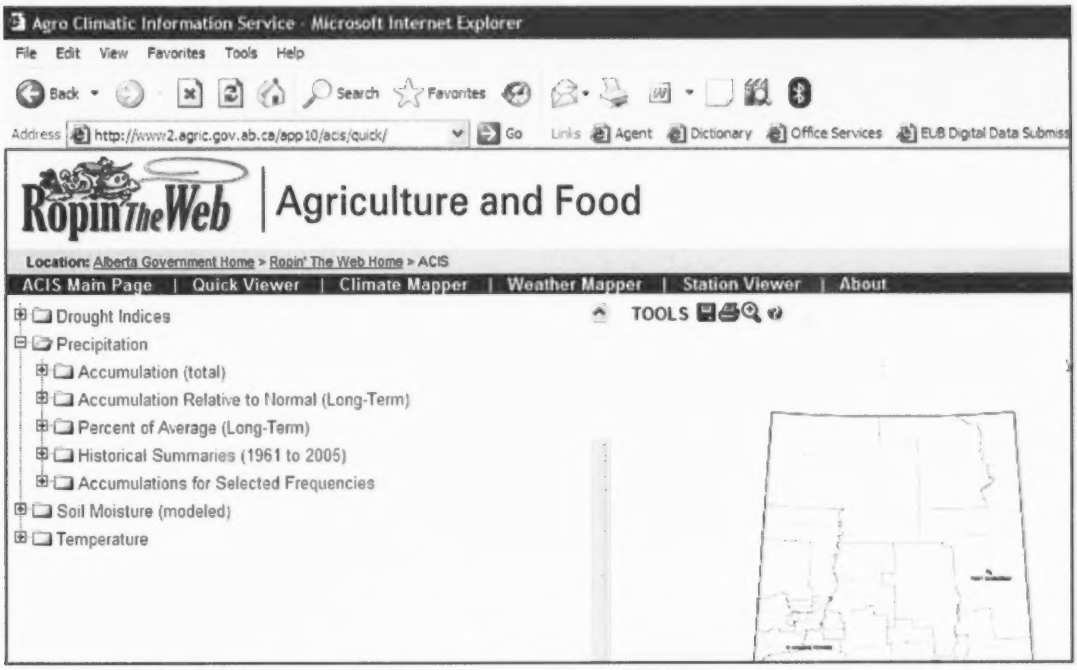
   - User: guest
   - Password: guest

   Search the system for the proposed development area to obtain a list of available aerial photos. Choose photos of 1:40 000 or better resolution.

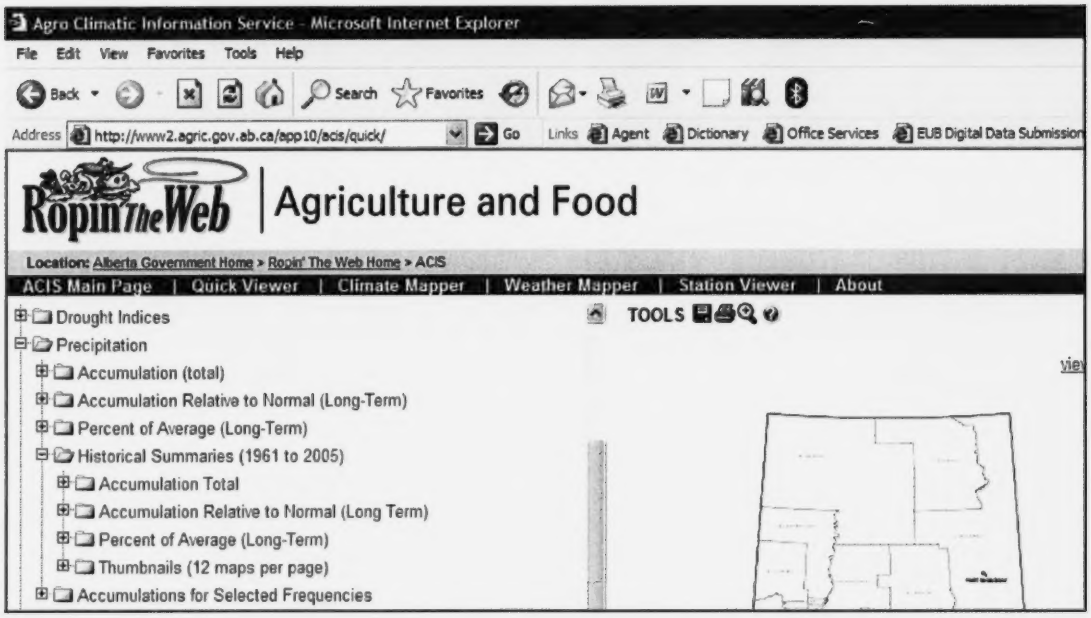

Search Results for Legal Description (S-T-R-M): 30-40-1-4 - Windows Internet Explorer
https://securexnet.env.gov.ab.ca/aprs/ControllerJsp.jsp
Live Search
Search Results for Legal Description (S-T-R-M): 30-40...
Page
Tools
APRS Results of Search By Legal Description
Search is based on section. When ordering, please provide the required project numbers and a more precise location (i.e. site diagram, quarter section, legal subdivision or street address).
NEW--> Click on the hilited projects to download a zip file containing the photo centres for the project.
Legal Description (Sec. Twp. Rge. W Meridian): 30 - 40 - 1 - 4
Project No. | Sub. ID | Coverage (Partial/Complete) | Date | Scale (1:) | Emulsion | Comments
06-017 | 8 | C | 2006-08-06 | 30000 | Colour IR 1443 | Multiple Dates, OP-2005-354
98-097A 73D | 7 | C | 1998-00-00 | 30000 | B/W Agfa-50
92-147 | 8 | C | 1992-08-00 | 20000 | B/W PAN
87-089 | 9 | C | 1987-00-00 | 30000 | B/W PAN
87-089 73D | 14 | C | 1987-00-00 | 30000 | B/W Pan-2405
E84-028-10 | 5 | C | 1984-00-00 | 50000 | False Colour | Laser/scan only - check index for availability
82-087 73D | 9 | C | 1982-05-04 | 30000 | B/W Pan-2405
82-052 73D+ | 2 | C | 1982-00-00 | 60000 | B/W Pan-XX
77-036 | 33 | C | 1977-05-12 | 31680 | B/W Pan-2405
70-322 73D | 2 | C | 1970-00-00 | 80000 | B/W Pan-2405
68-73D | 4 | C | 1968-00-00 | 31680 | B/W
63-73D | 2 | C | 1963-07-16 | 31680 | B/W Pan-2402
Done
Internet
100%
Start
Inbox - Micros...
APRS Applicati...
2 Microsoft ...
2 Windows E...
Search Resul...
1:59 PM

2) Information to correlate climatic data with aerial photography is available at AgroClimatic Information Service at http://www2.agri.gov.ab.ca/app10/acis/quick/.

- On the left-hand side, click on the "+" beside precipitation.
- Selections as shown in the screen below will be available.


Agro Climatic Information Service - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://www2.agric.gov.ab.ca/app10/acis/quick/
Go Links Agent Dictionary Office Services EUB Digital Data Submiss
RopinTheWeb
Agriculture and Food
Location: Alberta Government Home > Ropin' The Web Home > ACIS
ACIS Main Page | Quick Viewer | Climate Mapper | Weather Mapper | Station Viewer | About
Drought Indices
Precipitation
Accumulation (total)
Accumulation Relative to Normal (Long-Term)
Percent of Average (Long-Term)
Historical Summaries (1961 to 2005)
Accumulations for Selected Frequencies
Soil Moisture (modeled)
Temperature
TOOLS

- Click on the "+" beside Historical Summaries.


Agro Climatic Information Service - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://www2.agric.gov.ab.ca/app10/acis/quick/ Go
Links Agent Dictionary Office Services EUB Digital Data Submission
RopinTheWeb
Agriculture and Food
Location: Alberta Government Home > Ropin' The Web Home > ACIS
ACIS Main Page | Quick Viewer | Climate Mapper | Weather Mapper | Station Viewer | About
Drought Indices
Precipitation
Accumulation (total)
Accumulation Relative to Normal (Long-Term)
Percent of Average (Long-Term)
Historical Summaries (1961 to 2005)
Accumulation Total
Accumulation Relative to Normal (Long Term)
Percent of Average (Long-Term)
Thumbnails (12 maps per page)
Accumulations for Selected Frequencies
TOOLS

Under each heading:

- **Accumulation Total** – the sum of the precipitation received for that time period
- **Accumulation Relative to Normal** – the precipitation ranking for a particular year based on a 45-year observation period from 1961 to 2005
- **Percent of Average** – the average of the sum of yearly precipitation data for the years 1961 to 2005 inclusive

The following choices will be presented for the years 1961 to 2005 inclusive:

- Yearly – January 1 to December 31
- Growing Season - April 1 to September 30
- Cold Season – October 1 to March 31

Use the information in the **yearly** maps for Accumulation Relative to Normal.

The **Thumbnails** heading provides a quick view of maps, 12 years per page, for accumulations relative to normal.

Accumulations for Selected Frequencies provides information to determine the amount of precipitation that can be expected for a given frequency to aid in construction design.